

# DÁIL ÉIREANN

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## AN COMHCHOISTE UM GHNÍOMHÚ AR SON NA HAERÁIDE

### JOINT COMMITTEE ON CLIMATE ACTION

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*Déardaoin, 18 Deireadh Fómhair 2018*

*Thursday, 18 October 2018*

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The Joint Committee met at 1.30 p.m.

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#### MEMBERS PRESENT:

Deputy Jack Chambers,	Senator Paul Daly,
Deputy Marcella Corcoran Kennedy,	Senator Ian Marshall,
Deputy Timmy Dooley,	Senator Michelle Mulherin,
Deputy Tom Neville,	Senator Grace O'Sullivan.
Deputy Carol Nolan,	
Deputy Sean Sherlock,	
Deputy Brian Stanley,	

In attendance: Deputies David Cullinane and John Curran.

DEPUTY HILDEGARDE NAUGHTON IN THE CHAIR.

*The joint committee met in private session until 2.20 p.m.*

### **Third Report of the Citizens' Assembly: Discussion (Resumed)**

**Chairman:** I welcome members and the viewers who may be watching our proceedings on Oireachtas TV to the eighth public session of the Oireachtas Joint Committee on Climate Action. Before I introduce our witnesses today, at the request of the broadcasting and recording services, visitors in the Public Gallery and members are requested to ensure that for the duration of the meeting their mobile phones are turned off completely or switched to flight mode.

On behalf of the committee I extend a very warm welcome to Dr. Orlaigh Quinn, Secretary General, and Mr. David Hegarty, Ms Marie Bourke and Ms Claire Pyke from the Department of Business, Enterprise and Innovation. I also welcome Professor Mark Ferguson from Science Foundation Ireland, Mr. Kieran Donoghue from IDA Ireland and Ms Rowena Dwyer from Enterprise Ireland.

Before we commence I advise the witnesses that by virtue of section 17(2)(l) of the Defamation Act 2009, witnesses are protected by absolute privilege in respect of the evidence they give to the committee. However, if they are directed by the committee to cease giving evidence on a particular matter and they continue to do so, they are entitled thereafter only to a qualified privilege in respect of their evidence. Witnesses are directed that only evidence connected with the subject matter of these proceedings is to be given. Witnesses are asked to respect the parliamentary practice to the effect that they should not comment on, criticise or make charges against a person outside the Houses or an official by name or in such a way as to make him or her or it identifiable. Members are reminded of the long-standing ruling of the Chair that they should not comment on, criticise or make charges against a person outside the Houses or an official by name or in such a way as to make him or her identifiable.

Due to our time constraints I ask that Dr. Quinn would give the committee a synopsis of her opening statement because the members have already read the opening statement. I shall give Dr. Quinn three minutes and if she feels there is anything else to add throughout the questioning Dr. Quinn can come back in at any time.

**Dr. Orlaigh Quinn:** I thank the Chairman. I have prepared an opening statement, which is what I was asked for, so I would appreciate being able to give it.

**Chairman:** Could we keep it to about three minutes or try to keep it as short as possible?

**Dr. Orlaigh Quinn:** I will try to keep it as short as possible.

**Chairman:** I thank Dr. Quinn.

**Deputy Sean Sherlock:** The members have read the opening statement. We are very much briefed on the opening statement. In order to allow for a concise opening statement and a proper question and answer afterwards, that is why the members came to that conclusion.

**Chairman:** Would it be possible for Dr. Quinn to do it within three minutes?

**Dr. Orlaigh Quinn:** I will do my best, but as I have said, I have prepared the statement, which the committee asked me to do.

**Chairman:** How long is it?

**Dr. Orlaigh Quinn:** It is a small number of pages.

**Deputy Sean Sherlock:** We have received it.

**Chairman:** We will let Dr. Quinn come in.

**Dr. Orlaigh Quinn:** I am also conscious that this is an important topic for our Department and we have highlighted to all of our staff that the Department is before the committee today. It is important that they also can benefit from the committee.

**Chairman:** Absolutely, and that is why I want to give it the time.

**Deputy Jack Chambers:** Will there be a time limit?

**Chairman:** Yes, it shall be three minutes and I will let the committee know when we get to the three minutes.

**Deputy Timmy Dooley:** For clarity, is Dr. Quinn now going to try to condense the statement just by speaking more quickly to get onto the record what members have already had and read in preparation for today?

**Dr. Orlaigh Quinn:** I do not believe in speaking quickly so I will give the statement for the three minutes, as the Chairman has said.

**Chairman:** I thank Dr. Quinn. We shall commence now, because we are wasting time.

**Dr. Orlaigh Quinn:** Absolutely.

**Deputy Jack Chambers:** And will there be a question and answer session afterwards?

**Dr. Orlaigh Quinn:** I have no difficulty with that, and the team is here to assist the committee. We can stay as long as the committee wishes for the questions.

**Chairman:** I thank Dr. Quinn.

**Dr. Orlaigh Quinn:** The Chairman has already introduced my colleagues so I will not go through that again. It is, however, important to note the role of the Department in terms of enterprise policy and to note that as part of all of our strategic work and our policies we are involved in recognising the role of enterprise and the need for sustainable development. We know that the development of low-carbon, bio and circular economies presents commercial opportunities to companies across many sectors in Ireland, and we work on that basis.

In my statement I have touched on the importance we are placing on the Future Jobs for Ireland initiative, which will be launched next year. This very much takes into account environmental issues, international agreements and industry responses around the global economy and the technology sector.

Regional development is a particular concern of Government and we have focused very strongly on the need for balanced regional development and job creation. My statement includes some data on the work the Department has done in that area, which is all focused within the development of the national planning framework. This is also focused on sustainable enterprise.

We are particularly involved in innovation policy, which is very strong with regard to our strategy for research development. Again, this has a strong focus on Ireland being a global innovation leader while being very focused on sustainable resource management. This brings us into many of the areas this committee is looking at with regard to climate change and de-carbonisation. The Department has completed a major refresh of our research priority areas, which includes energy, climate action and sustainability; advanced and smart manufacturing; and sustainable food production and processing.

Disruptive technology is another initiative of the Department where we have highlighted and put out a major call. We have had a very successful response to that and it will be coming through at the end of the year.

The Department is represented on a wide number of committees across Government. We contribute from our research perspective and from the corporate perspective. Corporate responsibility is something on which we lead and we are taking a very strong approach and we are working with companies to develop it. All of this is around mitigation efforts. We are involved in adapting and mitigating and we have reviewed all of our policies from the climate perspective.

The Department also recognises that there are many opportunities for Irish business. The whole development of the bio-economy and the circular economy provides opportunities for Irish companies to get involved. We have reflected that.

I have given the committee some details of the schemes in the mitigation sector. I have touched on the role of our enterprise agencies IDA Ireland and Enterprise Ireland, and on the strong partnerships working with industry in this area, and in particular Science Foundation Ireland. I am delighted that Professor Ferguson can be with us today. There are 17 research centres and I am sure that Professor Ferguson can speak about those and the impact they have, and on how we develop.

This is a very short breakdown of the written statement that I had submitted to the committee.

**Chairman:** It is much appreciated

**Dr. Orlaigh Quinn:** I am more than happy, as are my colleagues who are expert in their areas, to assist the committee.

**Chairman:** I thank Dr. Quinn for keeping the opening statement brief. I now invite Deputy Sherlock. I will be strict in terms of the ten minutes for each member.

**Deputy Sean Sherlock:** I thank the witnesses for coming before the committee today. According to the Intergovernmental Panel on Climate Change, IPCC, report on global warming of 1.5o C as a result of CO2 emissions from industry, pathways limiting global warming to 1.5o C are projected to be approximately 75% to 90% lower in 2050 relative to 2010. That is compared with the 50% to 80% figure for global warming if we are projecting up to 2o C. Will Dr. Quinn indicate the emissions trajectory for Irish industry from now to 2030 and from now to 2050? Will I continue with my questions?

**Chairman:** Does Dr. Quinn want to take note of the questions and then respond?

**Dr. Orlaigh Quinn:** Sure. I will do that.

**Chairman:** The officials will take note of them and Dr. Quinn can respond at the end of the questioning.

**Deputy Sean Sherlock:** That is the first question. If there is a difference in that respect, how different is the current trajectory in terms of the requirement for industry to cut emissions by more than 75%? I cannot see any specific figures in Dr. Quinn's submission on cutting emissions. I would like to see information from the Department in respect of those figures.

The second theme also emanates from the recent IPCC report. How will the Department assess the specific actions it must take to lead Irish industry in delivering what we call the deep cuts in overall emissions in the next 12 years? We have gone from a 2030 to 2050 outlook to a 12-year outlook, which I believe will be the *modus operandi* of this committee. I refer to the recent IPCC report dealing with the 12 years from now. How will individual Departments move towards radical policies across their agencies to target those deep cuts that are so necessary? What specific actions will the Department of Business, Enterprise and Innovation take?

On the research, development and innovation, RDI piece, priority areas were noted in the submission. I have some degree of familiarity with those priority areas. How much money is being allocated across those thematic areas, specifically relating to energy, climate action and sustainability, including the decarbonisation of the energy system and sustainable living? What are the names of the research centres? How much money is each research centre receiving? What is the total amount of moneys being received for each of those centres? Is the issue of climate change or radical climate action in respect of the 12 years mapped across the area of food, for instance, in terms of smart and sustainable food production and processing and on manufacturing and novel materials, including advances in smart manufacturing?

**Chairman:** We will leave it at that and Deputy Sherlock can use the remaining part of his ten minutes later; he spoke for almost four minutes. A number of questions have been put and the witnesses may respond to them in whatever order they wish.

**Dr. Orlaigh Quinn:** I will start, and I will ask Ms Bourke to come in on the emissions trading scheme, ETS. Professor Ferguson might comment on the science in terms of the research centres.

From the Department's perspective, our main contribution to reducing emissions is through the European Union ETS. That involves approximately 100 of Ireland's largest energy users who account for 25% of emissions. All Irish industrial installations with installed energy generating capacity of more than 30% are included in the ETS. For the larger energy users, they are there. Is it achieving its aims? It is true that we are not on course to meet our climate change targets. The projections are that we will fall short of both our emissions and our renewable energy targets. We have a target set and we are working to achieve that. It is estimated that we will reach approximately 80% of the target.

What I have heard is that as the 2013 to 2020 requirements from the EU in particular run out, the sectors covered must reduce emissions by 43%, so there are areas on which we have to work. Our job is to help companies move towards those targets. We have a number of schemes in place. Enterprise Ireland, EI, and IDA Ireland can talk about their specific schemes. In particular, we work closely with our colleagues in the Department of Communications, Climate Action and Environment.

It is the case that as enterprises, and particularly smaller enterprises, move to reduce emis-

sions there will be costs involved and, over time, there will be areas that we will need to help and incentivise to do that.

Deputy Sherlock mentioned the food companies. Some of the bigger food companies are in that sector. Many of them are already in the 100 companies, so they are working already to reduce their emissions. There is a huge amount of work going on in that area. Those of us in the Department are very much involved in the research aspects. Professor Ferguson can speak on the research institutes. I will ask Ms Bourke to contribute on the ETS.

**Ms Marie Bourke:** The emissions trading scheme is the key scheme for getting the large energy users into energy efficiency. We are now moving into phase 4 post-2021 and each iteration of the scheme is more stringent, with less auctioning of allowances. Surplus allowances will be withdrawn through a market stability reserve. That will increase the price of allowances within the ETS and lead to the more efficient operation of the scheme. That scheme has just been negotiated. The Department of Communications, Climate Action and Environment will be going out to consultation shortly on some of the options within that scheme and looking for applications on it. Each phase of the scheme is leading to an increased price of carbon, which will incentivise emissions reduction. That is our main focus for companies in the beverages, pharmaceuticals, healthcare and ICT areas, the dairy co-operatives and food companies.

In parallel, there is the large energy user scheme run by the Sustainable Energy Authority of Ireland, SEAI. Two hundred of the large energy users are engaged in that scheme. They account for 50% of total industrial use and 20% of primary energy use.

There is a series of other schemes for the smaller users to try to improve energy efficiency with mentoring programmes, access to technology experts and management training in the area of energy reduction. There are a number of agency client companies and businesses and the key objectives of those is to reduce their energy consumption.

As Dr. Quinn referred to earlier, we have worked with companies on corporate social responsibility and shown how businesses can improve their business activity by showing they are energy efficient and sustainable. Increasingly, we are seeing consumers and users demanding that of corporations.

**Chairman:** Does Professor Ferguson want to come in on the research centres?

**Professor Mark Ferguson:** I can do that. Deputy Sherlock asked about the research centres that would be involved in climate change. There are four, principally. MaREI is the Science Foundation Ireland, SFI, research centre for marine renewable energy. The SFI investment on that is €18.9 million, to the nearest €100,000. There is almost a comparable investment from industry and the EU for all these research centres but that is the SFI investment. BEACON, which is about the bio-economy and will be formally launched tomorrow in Lisheen, is an SFI investment of €15 million. iCRAG, which is about applied geosciences, is an investment from SFI of €24.8 million. VistaMilk, which was launched recently and is about precision dairy, is an investment from our Department and the Department of Agriculture, Food and the Marine of €25.6 million. Each of those research centres do research that is relevant in some way or another to climate change. I extend a very warm welcome to the committee members to visit any or all of those research centres; we would be delighted to host them. MaREI is in Cork, as is VistaMilk, and BEACON and iCRAG are at University College Dublin. Committee members would be very welcome and we would be happy to host them.

I will say a couple of words-----

**Deputy Sean Sherlock:** I have only one minute left. I thank the delegates for their answers, but we only have ten minutes each and I am trying to be as efficient as possible. Could a breakdown of the figures be sent to the committee?

**Chairman:** It could be forwarded to the clerk.

**Deputy Sean Sherlock:** On emissions trading, there is a question outstanding about how the model works and the offsets industry can use. It would be useful for us to have a better understanding of how it works and the 100 companies involved. Perhaps we might receive a synopsis of that information or an aide-memoire as it would help the work of the committee.

**Chairman:** It would be fantastic if it could be forwarded to the clerk. The delegates should feel free to supply anything else they wish to provide in writing for this discussion.

**Deputy Marcella Corcoran Kennedy:** I thank the delegates for joining us and their document. The presentation states the enterprise sector was not identified specifically as one responsible for preparing sectoral adaptation plans under the national adaptation framework. What are the delegates' views in that regard? Were they surprised or had they been invited to make a submission?

**Dr. Orlaigh Quinn:** We have been very involved and feed into plans. We will contribute, as requested. From our perspective, on the broader industry front, we will always contribute.

**Ms Marie Bourke:** The enterprise sector is predominantly involved in the ETS. The measures are quite stringent for companies. They account for such a significant proportion of the enterprise sector's overall emissions that it may be the main reason we are not included specifically.

**Deputy Marcella Corcoran Kennedy:** I note the reference to driving growth in the global clean technology sector. What opportunities for business have the delegates identified to help us all to change the way we do business? How are they planning to encourage people to invest in renewable energy measures and so forth?

**Dr. Orlaigh Quinn:** As we are part of many of the groups, we feed into the research piece. On specific programmes to assist companies, there is a range of initiatives. Ms Dwyer from Enterprise Ireland and Mr. Donoghue from IDA Ireland can give details of specific initiatives where we work with companies.

**Ms Rowena Dwyer:** Our strategy to support enterprises in the Enterprise Ireland client company base comes under three pillars - market diversification, innovation and competitiveness. Competitiveness and innovation are the areas where the environmental supports for companies are most relevant. As has been mentioned, there is the ETS for larger companies. For smaller companies, in particular, we have a significant number of competitiveness supports under the Lean programme. The programme aims to make companies aware of the dividend available by improving their resource efficiency. That will increase their competitiveness and, in many cases these days, their access to the customer base. We know that consumer demand is driving behavioural change in companies. Our competitiveness supports for companies in this area range from straightforward guide books on resource efficiency for smaller companies - many of our client companies are quite small - through to funding feasibility projects to examine improving production design to make it more environmentally sustainable.

On the innovation side, there are a number of initiatives co-funded by us and IDA Ireland and in close co-operation with SFI. Our technology centres, for example, are industry-led, collaborative research entities that look at where industries together can achieve a competitive advantage through research. In a number of the technology centres there is a strong focus on energy efficiency and improving environmental outcomes. A good example is the dairy processing technology centre based in the University of Limerick, in which all of the major dairy players are involved. As well as looking at their cost competitiveness, one of the pillars is energy efficiency and environmental research.

**Mr. Kieran Donoghue:** The environment has been a major feature of the way in which IDA Ireland has gone about executing its mandate for more than ten years. Two specific initiatives might be of interest to the Deputy. In 2009 we introduced an environmental aid programme which we marketed and promoted to our clients to encourage them to adopt renewable energies - combined heat and power, biomass, CHP energy efficiency and so forth. There has been a significant take-up of the scheme by our large energy users. It has allowed many of them to move to 100% renewables or significantly change the fuel mix in their energy use. The second initiative was we established new forms of FDI teams in 2015 and tasked them with going to the marketplace to identify potential investment opportunities aligned with a pro-environment, positive climate action agenda. We have won a number of investments in that area, for example, smart metering, new forms of energy and so forth. During the summer we also introduced our Go Green programme which we are actively promoting to our clients to raise environmental awareness within the portfolio. We are providing financial incentives for them to reduce their energy usage, become more efficient and move to a 100% renewables model.

**Deputy Marcella Corcoran Kennedy:** The Sustainable Energy Authority of Ireland was referred to. In what way is the Department connecting with it? We heard at one of our previous meetings that the retrofitting of domestic houses was going to be crucial. I believe there will be a great deal of business in that area for small and medium enterprises. Does the Department have a link with local enterprise offices, for example? They are a targeted group that is connecting at that level. Do they have a climate agenda in considering businesses they could potentially assist?

**Dr. Orlaigh Quinn:** To take it back a step, when we develop our policy and research priorities, it impacts on the way we deliver our business. There was a major refresh of our research priority themes in 2017, as part of which we introduced decarbonising the energy system and sustainable living as a new priority. As we roll out programmes and adapt, they set the priorities.

I will have to refer back to the Deputy on the LEOs, unless Mr. Hegarty wishes to comment.

**Mr. David Hegarty:** We do not have facts and figures, but the Deputy is correct in her assertion that it might represent an opportunity for smaller firms. We will see if we have any information on LEOs funding or assisting companies in that area, but I take the Deputy's point that it is an opportunity. More generally, there are opportunities in adapting to climate change. We want to ensure our programmes and agencies are able to facilitate and exploit these opportunities.

**Deputy Marcella Corcoran Kennedy:** The message coming through from everybody is that a whole-of-government and whole-of-society approach will have to be taken. Getting the message out on climate change through the LEOs is something we welcome.



**Dr. Orlaigh Quinn:** Absolutely. In the refresh of priorities we have identified advanced and smart manufacturing and manufacturing of novel materials which we see as opportunities. We also redirect funding and grants in that area. The disruptive technologies fund had a specific theme to address climate change challenges. Again, as we roll it out, we want to see that impact.

**Professor Mark Ferguson:** We co-fund with the Sustainable Energy Authority of Ireland. In fact, we are the major funder in some of the research activities. We co-fund with it and make sure the research is aligned with its policy and implementation. Clearly, it does not have anything to do with retrofitting but with future stuff. There will be new opportunities, not just in mitigation but also in the active removal of greenhouse gases. I hope the committee will look at new science in taking carbon dioxide out of the atmosphere. There are major opportunities for Ireland in that area. There are various technologies, from the rehydration of bogs and peatlands to the pumping of CO<sub>2</sub> into the spaces vacated by gas extraction, which produces low-carbon gas - the Corrib field would be a good place for this - to the absorption of CO<sub>2</sub> from crushed basalt, of which we have a lot, particularly in Donegal, to the new way of manufacturing concrete and then to very active CO<sub>2</sub> capture. By way of showing the committee that some of this research is coming through, a company called Silicon Kingdom Holdings, which is all of two weeks old, is carrying out active CO<sub>2</sub> capture in Ireland and will build a small pilot CO<sub>2</sub> farm over the course of 2019-2020, with one or two clusters of CO<sub>2</sub> collectors, each capable of capturing approximately 1 tonne of CO<sub>2</sub> a day. Its plan envisages CO<sub>2</sub> farms of 120,000 collectors, which would capture 3 megatonnes of CO<sub>2</sub> per annum.

In managing climate change, we definitely must implement all the mitigation measures on which the committee is focused but we also must think of active ways of managing greenhouse gases by removing them from the atmosphere. We will never have a carbon-zero economy, and this acknowledgement must be part of the strategy. There is a lot science in this regard which is mostly at the research stage. However, some of it is filtering through to the commercial stage.

**Chairman:** I ask Deputy Corcoran Kennedy to be very brief. She has less than 60 seconds.

**Deputy Marcella Corcoran Kennedy:** It is a good that this is my final group of questions. Professor Ferguson mentioned some of the State agencies and referred to bogs. I am from the midlands so, naturally enough, my ears pricked up straight away. What kind of engagement have the witnesses had with the biggest landowners in the country, namely, Bord na Móna and Coillte, regarding the resources they possess? They are very progressive in what they want to do.

My other question is more of an observation. I refer to the responsibility to get the message and the communication strategy out that while it is a huge challenge for us to decarbonise society, there are huge opportunities for business in it. Are the witnesses prioritising this in light of the IPCC report?

**Professor Mark Ferguson:** I can pick up on the first question. I recommend that the committee talk to Professor Murray Hitzman, who is the director of iCRAG. Rehydrating bogs is a most effective way of capturing carbon. Basically, the plant takes CO<sub>2</sub> out of the environment. It does not decay properly so all the CO<sub>2</sub> is trapped in the bog. There are people looking very actively at this, and iCRAG is working very closely with Bord na Móna. I will hand over to my colleagues for the other questions.

**Dr. Orlaigh Quinn:** On communications generally, we feed into Government policy; we do not set policy. In this regard, it is important that we are represented on all the relevant groups.

We are represented, for example, on the climate action high-level steering group. We are on the Cabinet committee that the Taoiseach chairs on economic infrastructure and climate change. We are on the technical research and modelling group and the senior officials' group on sustainable development goals, energy labelling and offshore renewable energy. To all these areas we bring the expertise of our colleagues in our offices and agencies. I should also mention the National Standards Authority of Ireland, which is not represented today, because one of our offices has a huge role in setting standards in this area. We bring that into all these fora and work collectively with colleagues to inform Government policy.

**Senator Grace O'Sullivan:** We are here today because Ireland is seen as failing on every climate target. As the Taoiseach stated just a few months ago, Ireland is a laggard. All the information is stacking up to show us this. The IPCC report just last week gives us a 12-year window. As a result, our ambition in this area cannot be great enough. I have a number of questions about just transition. In her report, Dr. Quinn rightly recognises the economic opportunities which come from the transition to low-carbon and circular economies. However, she fails to refer to the impacts on employees and communities which have come to depend on this fossil fuel economy. These impacts are significant and we must address them out of concern for the welfare of the citizens and communities involved. In addition, failing to ensure a just transition makes making the transition even more difficult. What is the Department's understanding of the just transition process and what are its plans for the coming years? We have a just transition commission, and SIPTU, ICTU, Fórsa and IMPACT have all been working on this issue for some time. What is the Department doing to help the trade unions support their employees? Could the witnesses give an indication of specific things it is doing in this regard?

Health, the arts, education and community work are low-carbon job areas in Ireland, which is great. What supports is the Department giving to these industries to grow in the context of climate? Is it refusing to support the expansion of fossil fuel-based economic activity? From an enterprise perspective, has it set a line in the sand and said, "That is it. It is over. No more support for the fossil fuel-based industry."?

Regarding renewable jobs, at least 7,200 jobs in solar are waiting in the pipeline. David Connolly's Green Plan Ireland and the Northern Ireland Green New Deal Group have both outlined how there are opportunities for 100,000 new jobs if Government takes action now. I do not see any mention of this kind of ambition in Dr. Quinn's report. Why is that? As Professor Ferguson outlined, an opportunity exists. Why are we not unleashing this opportunity? We do not see it in Dr. Quinn's report.

Regarding FDI, Microsoft, for example, is looking for 100% renewable energy to run its offices and IDA Ireland is not providing this. Why is that the case? Ireland is the second windiest country in Europe after Scotland. In Scotland, 50% of renewables are owned by community co-operatives. Why are we not doing the same here? What measures could be put in place to support the community co-operative system? What is the Department doing to provide good-quality jobs in cheap energy for rural Ireland?

What is its definition of "sustainability" in the context of climate change? What is the analytical approach used by the Department in assessing the sustainability of business in Ireland? Does the Department carry out carbon footprint analysis? Does it measure material flows? Does it have a unit with the necessary expertise to analyse the sustainability and climate impact of policies which affect business? How-----

**Chairman:** Shall I bring in the witnesses? I am just conscious of getting answers to the

Senator's questions, and she may want to come back in at the end. I do not mind. It is up to her.

**Senator Grace O'Sullivan:** Anything that is not answered here will be on the record, so if the witnesses could come back and provide the outstanding answers to the committee, it would be much appreciated.

**Chairman:** Sorry. I just wanted to give the Senator time to come back if she needs to do so. She has raised issues that may relate to other Departments but I will let Dr. Quinn answer.

**Dr. Orlaigh Quinn:** It is certainly true to say that the economic and employment implications of a transition to a low-carbon economy and addressing the concept of a just transition were identified in the national mitigation plan. That plan is the responsibility of the Department of Communications, Climate Action and Environment but we obviously have a very strong interest in it and have played our part as a stakeholder. We must acknowledge that there are implications for employment in any transition, including, as Deputy Corcoran Kennedy mentioned, in terms of peat extraction, power generation and other environmental services. We are very conscious of the transition period that some enterprises need in order to move from their current state to a low-carbon state. The bioeconomy policy statement, for example, identified the opportunities to grow rural and regional businesses and jobs, and we see this as a major opportunity. In fact, I think when the Minister published her most recent budget statement, her focus was very much on Brexit, regional development and innovation, which are the three themes on which we are working with her to deliver. There is huge potential to grow rural business. We accept that for some enterprises the opportunities are not there and it will take time. We also recognise that our current employment figures are extremely successful and we now face a very different set of problems from those we faced seven years ago when we had 16% unemployment. We now have 5.4% unemployment. Again, part of the model we are working on will flow from the research that Professor Ferguson outlined regarding the pilot bioeconomy centre at Lisheen.

We are aware of the new employment opportunities from a circular economy. This is one of the areas we have flagged. We are currently working on and hope to publish in January the future jobs initiative for Ireland. Up to now we have had the Action Plan for Jobs. It has been extremely successful and delivered 370,000 jobs. However, we are in a different phase of economic development now so we are working on identifying the following: quality jobs; pressure points; and areas where Ireland can innovate and add value. That reflects back on the work that we have done in identifying our research priorities. It will set our priorities and how we advance for the next future cycle of Ireland's development.

I have outlined our position. Perhaps my colleagues might wish to comment.

**Mr. Kieran Donoghue:** Senator Grace O'Sullivan observed that Microsoft sought to move to a 100% renewables model and referred to IDA Ireland's lack of support for this. It is important to put on the record that IDA Ireland actively encourages and supports all of its clients to act in an environmentally sustainable way. As members will know, the vast majority of the companies involved come from very mature and well-developed economies with high environmental sensibilities. They bring with them into our economy those sensibilities, an environmental awareness and a desire to embrace best practice in terms of sustainability. Globally, Microsoft moved to a 100% renewables energy model in 2014 so it is already there. Recently, Microsoft entered into a power purchase agreement in Ireland with a wind farm constructed by General Electric in County Kerry. That is another practical example of what our clients are doing in this jurisdiction in order to act in an environmentally sustainable manner.

**Senator Grace O’Sullivan:** Having the facilities to entice FDI into Ireland and being ready to support companies would be worthwhile. I urge IDA Ireland to provide more support in respect of renewables.

**Mr. Kieran Donoghue:** We support companies in two ways. As already stated, we have an environmental aid programme. This means that there is a suite of financial incentives we can deploy and utilise with our clients. Separately, and consistent with Government policy that dates back to 2010, we sponsored the establishment of the International Energy Research Centre at the Tyndall National Institute in Cork. One of our clients, United Technologies, also brought in an energy research centre. Deputy Eamon Ryan would have been a major advocate for that centre at the time. The initiative has proved very positive and sends a signal to our clients about the importance that we attach to the environment. The initiative also enables companies to carry out environment-related research in this jurisdiction.

**Ms Rowena Dwyer:** Similar to Mr. Donoghue, I shall give some practical examples. The opportunities that are available to enterprises in Ireland in the area of clean technology have been mentioned. Enterprise Ireland, recognising that there are opportunities in renewable energy, energy efficiency, smart services, etc., has had a designated sectoral grouping of what we call our clean-tech clients for a number of years. Similar to all other Enterprise Ireland clients, the members of this group are supported in their research and innovation, in their competitiveness and in areas such as management development in order to make them better at realising opportunities. Enterprise Ireland supports the enterprises in this sector to realise opportunities. Very importantly, Enterprise Ireland builds a lot of awareness among companies of what other companies provide in terms of services. While a lot of work is done to make companies aware of energy efficiency and how it can impact on their business, there is also an ecosystem by means of which companies are brought together in order to make them aware of the services others provide and to generate opportunities.

Enterprise Ireland is a co-ordinator for the EU’s research programme Horizon 2020. Irish companies have secured a significant amount of funding in recent years in the area of energy efficiency, grid integration and ocean energy in particular. The companies are supported by Enterprise Ireland and the other agencies to win research funding thus improving their understanding and ability to deliver services and products in this area that will make them market leaders.

**Chairman:** I call Senator Paul Daly. The Senator has ten minutes.

**Senator Paul Daly:** I will not need ten minutes. I will be as brief as possible.

Most of the conversation has been about working with existing companies and trying to improve their efficiencies. How far outside the factory gate do our guests’ organisations go? Does they have an input in that regard? I am talking here in terms of the national development plan or the national planning framework. One can have the most efficient company business, whatever their business may be, but if they are located in the wrong place, their workers can have an enormous carbon footprint. How far down the line do they go in having an input into that aspect?

Jobs and job creation are king, especially for IDA Ireland and Enterprise Ireland. Let us say that a super company wants to locate operations here. It is a massive FDI opportunity and there is massive job potential but, depending on the nature of the business, it does not tick all of the boxes when it comes to policies on CO<sub>2</sub> or other greenhouse gas emissions. Where would our guests draw the line? Would climate change take precedence? Where would they draw the

line and say, “Sorry, we are not interested. We suggest you go somewhere else”? Let us say afterwards it becomes public knowledge that the organisations our guests represent turned away a company that wanted to create 1,000 jobs. In that instance, how would they justify turning down such an opportunity? Would they say that the company in question was going to have an enormous impact in the context of the greenhouse gas emissions of this nation? Where would they draw the line? Where would they finish their negotiations as to how they can achieve more acceptable figures when it comes to CO2 emissions or whatever? How much precedence would climate change be afforded in negotiations?

My final questions relate to interdepartmental communication and the initiatives the Department is driving through research and development. In terms of the companies that are buying in and that are actively involved in research and development and improving their processes through the work the Department is doing with them, how successful are their efforts? How difficult is it for companies to recruit the employees they need to work on new initiatives? What level of communication has the Department got with the education and science sectors, for example, in terms of apprenticeships or third-level training or education for the workforce that, possibly, is going to be needed if people row in with the Department and are successful in developing their industries?

**Dr. Orlaigh Quinn:** I will start and my colleagues can chip in. I will answer the Senator’s final question first. We are very involved with our colleagues in the Department of Education and Skills. The Minister for Education and Skills is chair of the national skills council, of which my Department is a member. The Department would feed in, very strongly, in terms of its view of the economy, apprenticeships and skills because we hear that directly from the industry representative groups. We play a strong role.

The Senator asked how far does the Department go in terms of an enterprise and employees. That is not our role. Our role is to work with enterprise but we do very much work with companies. For example, in the retail sector, the retail forum is chaired by the Minister for Business, Enterprise and Innovation. We can exert influence on things like plastic packaging and we support our colleagues in the Department of Communications, Climate Action and Environment, which has overall responsibility in that area. Retailers have announced initiatives to reduce the amount of plastic packaging they use. Again, we can support such initiatives and we can bring companies together. I know that Enterprise Ireland will convene an industry-led conference on the matter in early 2019. My Department has what I call a soft influence in those areas and we work collectively with colleagues across other Departments. It is not our role to assess what other colleagues are doing in terms of their initiatives. We will certainly come back through on the evidence of the research. It is on that basis that we work.

The Senator asked how far we would we go. Mr. Donoghue may also wish to comment on this aspect. The Department operates within the policies, guidelines and criteria set down by the Government. We use the current guidelines. Mr. Donoghue may want to add a word to that. Ireland is not in the business of attracting business that is not sustainable or that damages our reputation. That is really where we position ourselves.

**Mr. Kieran Donoghue:** I thank the Secretary General. It is a very interesting question. I would say that the vast majority of the sectors that we target are relatively low emitters of CO2. Considering the composition of our business, a lot of it is now services rather than manufacturing and those businesses tend to have a low carbon footprint and are attracted to compact, urban centres with public transport and so on. In terms of the commuting patterns associated with their workforce and the type of goods and services they deliver to the global marketplace,

we do not associate them with potential damage to the environment from a carbon emitting perspective.

On the manufacturing side, the types of clients that we win in the life science and biopharmaceutical sectors have all embraced very strong environmental agendas at corporate HQ overseas. They bring those agendas into Ireland and we see them immediately taking steps at their local sites to embrace 100% renewable energy and to take a range of actions consistent with the best interests of the environment. Specifically in response to the question, we have never had to turn down an investment on the basis that it was high carbon emitting. We have not come across that scenario.

**Deputy Brian Stanley:** My question is around work with the development agencies. What work is happening in terms of developing the circular economy, particularly in respect of the reuse of waste and putting it to some kind of productive use? Can the Secretary General or other members of the panel cite some examples of initiatives like that?

**Professor Mark Ferguson:** We are funding a research centre called the Beacon research centre. It is about the bio-economy. It officially launches tomorrow. It is in the Lisheen disused mine. The researchers are concentrating on how to get high value products out of waste, specifically from the dairy industry. When dairy products are processed, by-products are often put into landfill. They can be made into lactic acid, which is a starting block for building a bio-plastic. We can make plastics from milk, to be simplistic about it. It is scaling. Glanbia, which members will know is a large co-op, secured a very large grant of about €30 million from the European Union. We and others are co-funders of that. Glanbia is building a pilot plant to process the waste that has been piloted in this research into building blocks for the circular economy.

We want to do a lot more in fishing, where there is a lot of waste, and in other areas. The bio-economy is an active area. There is a policy on it from the Department of the Taoiseach. We have implemented this with very good funding through a research centre and there are companies pulling through on that. We are working closely with our colleagues in Enterprise Ireland, IDA Ireland and other bodies. Of course there is more that can be done.

**Deputy Brian Stanley:** Could I ask the name of the company that is going to do this in Lisheen?

**Professor Mark Ferguson:** In Lisheen the research centre is called Beacon and there is a bio-economy foundation, a charitable foundation, that is taking over the use of the mine and the project has also got a lot of industry contributions. The pilot plant in Lisheen is being built by Glanbia.

**Deputy Brian Stanley:** That is just on the edge of my constituency so I am familiar with it.

**Professor Mark Ferguson:** We would be very delighted to see the Deputy there tomorrow.

**Deputy Brian Stanley:** I am grateful for the invite. It is the first one I have received.

Bord na Móna is an industry that is in radical transition and is moving away from peat and carbon. Things are going to be stepped up a gear very quickly on that. One of the big issues we are facing is the availability of biomass. This issue crosses over with the Department of Agriculture, Food and the Marine and other Departments. What is being done to develop a biomass industry here? A related issue is biogas. On the Continent, other countries are ahead

of us even though proportionately they do not have as large an agricultural sector as we have and do not have the peat sector or the landmass to locate some of these plants. We have those things. The issues of Bord na Móna, biogas and biomass are related. They are really facing a huge transition, particularly in the midlands.

**Dr. Orlaigh Quinn:** We recognised back in 2016 in the Action Plan for Jobs that there were opportunities in this area. We strongly promoted the development of a bio-economy strategy. That strategy is being led jointly by the Department of Agriculture, Food and the Marine and the Department of Communications, Climate Action and Environment. They are taking forward a number of actions. One is around making sure we have coherence between all the sectoral strategies that impact on the bio-economy. That is really mapping out what is happening across the board. They are also looking at a network of representatives of commercial entities operating within the bio-economy and the relevant public bodies. That is where the likes of Bord na Móna would be coming in. They are looking at recommendations of how that can be impacted.

Professor Ferguson has already alluded to research. Particularly in real-world applications, that comes through. Then there is the examination of current legislative definitions of waste-----

**Deputy Brian Stanley:** If I may raise a point, the Sustainable Energy Authority of Ireland paper in 2016 said there was potential for 3,000 jobs. Even assuming that figure is only 2,000, I do not see any initiatives happening in the two or three years since then to try to kick-start this industry. I do not see it happening.

**Dr. Orlaigh Quinn:** That is where this group is really pulling together as I have outlined, even just pulling the sectors together, ensuring greater coherence and looking at the value chain propositions. Part of the group's terms of reference is establishing conditions required for commercial viability. I would say to the Deputy that it is a work in progress and those two Departments are probably well placed to give him more detail on that.

**Deputy Brian Stanley:** On retrofitting and energy conservation, there is a huge amount of work to be done in training and re-skilling workers. People who will be moving out of the types of industry they are in now will need to adapt very quickly. Have the Department and other relevant sectors taken on board the need to accelerate this?

**Dr. Orlaigh Quinn:** That is back to the skills agenda, the apprenticeships and training and the impact there.

**Ms Marie Bourke:** A number of years ago we did some research with the expert group on future skills needs in the green economy and identified some of the skills that will be needed for retrofitting, including training up apprentices whose numbers had been really low at the time, looking at building information modelling systems and looking at installation of windmills on land and sea and their maintenance because we did not have the skills at the time. There were a number of recommendations in that report that the Department of Education and Skills took up with regard to apprenticeship training and traineeships and, more particularly, looking to see whether we needed specific graduate programmes in some of these areas of renewable energy. The decision was that the graduate students need to come through the core programmes and do an add-on module as they specialise in these particular areas.

**Senator Michelle Mulherin:** As regards businesses transitioning and fulfilling their obligations or our objectives under a low-carbon economy, has the cost been calculated for foreign direct investment and for indigenous industries? I am talking about businesses bearing carbon

taxes - we are told we need more carbon taxes - as well as the public service obligation levies on their electricity bills and every other thing that we are going to be asking of them. What is the cost and how will that affect our competitiveness internationally? Has it been assessed formally and how has that been done?

Under the national planning framework, does the Department have a mandate now to roll out job creation in the regions that are structurally weaker and which have not attracted jobs in the same fashion that the big urban centres have? We often hear job announcements; I know we hear only about the foreign direct investment, FDI, jobs, but they are still all in the cities and not in rural areas, that is, the counties or areas that do not have big cities. It seems that in spite of our objectives to spread development more, and to take the pressure off Dublin, Galway, Limerick and so on, the natural way the economy is developing is that these cities are becoming more and more pressurised because they are where everybody wants to invest. What policies has the Department developed since the national planning framework? On the different regional action plans for jobs to ensure there is more job creation in these areas, what specifically is the Department doing?

There are regular parliamentary questions on how many visits there have been by the IDA with a potential investor into counties such as Mayo or Roscommon, which have some FDI. There has been growth in FDI but it is in the companies that are already there and which have been there for years, which we welcome, but there is no new investment and it is often only a handful of visits a year. What is the IDA doing now that is different to realise the objectives of the national planning framework, specifically to regional areas, bearing in mind that there are issues with getting investment in those areas? One thing that comes to mind is the whole area of data centres. We are told there are issues with Apple, where an issue with planning delayed the whole project. In Mayo we have planning permission for a data centre where there is a high-speed transatlantic fibre-optic cable, and there is planning permission for a combined heat and power plant beside it. There are no takers for the data centre, however. What is being done to promote investment in these situations?

Are some parts of the country more attractive from investment and energy security points of view? Some parts of the country have better energy security and better transmission infrastructure than others. Is that an impediment? Will the witnesses identify the areas of the countries where it is not so attractive and, where, if one was looking for a great deal of power one might not invest? Where do we need to invest in infrastructure?

**Dr. Orlaigh Quinn:** On regional employment, there has been an increase in employment of 12% from 2015 to 2018, some 61% of which has been in counties outside Dublin. We have a target that we should be within 1% of the national average outside Dublin, which all the regions of Ireland have achieved with the exception of one, namely, the midlands. In the Senator's area, the west, it is 6.7%, while the figure for the State is 6%. We are conscious that employment is growing across the country and in all areas, although the Border is still a difficulty for us.

**Senator Michelle Mulherin:** I accept that but the issue, which is borne out by the CSO census data, is that people are migrating into the bigger towns. People are leaving the more rural areas and going to the towns, even in my region.

**Dr. Orlaigh Quinn:** From the regional development strategy and national planning framework, which makes it clear, the purpose is to develop clusters and centres. I do not think we will ever see an Ireland with a concentration of jobs in every village, but we need to ensure we have sufficient presence across the region, which I think people in Dublin would say about commut-



ing as well. It is about trying to make it clustered and attractive for companies and people to locate, and it has been extremely positive. Both the agencies have been extremely successful in growing jobs, as have the local enterprise offices across all the regions of Ireland.

From our perspective, regional employment is one of our main priorities, as I mentioned earlier. Yesterday we met with the heads of the eight regional action plans for jobs, all of whom are private-sector people, in each of the regions with committees, highlighting the particular attractiveness and opportunities in each region because each region is different, and discussing how we can support them. We have a team of people in the Department working collectively with each of those regional action teams, which is how we drive employment forward.

I invite Mr. Donoghue to answer the Senator's question on the IDA visits.

**Mr. Kieran Donoghue:** I will build on the Secretary General's observations. The Senator makes valid points. Our approach to this is that we must try to match the right locations with the profile of the investor. It is important we take the investors' needs into account. One must consider that an increasing number are in the services sector and they emphasise the importance of locations either in or near cities. That does not prevent us, however, from showcasing other locations. We take a hierarchical approach, from cities and city regions to large towns and rural areas, as appropriate. Manufacturers, for example, do not want to locate in a city or city region. Rather, they want their own dedicated site in a more rural location. We showcase a variety of locations, therefore, to our clients. In Mayo, specifically, we have taken the step of putting an advance office building in Castlebar, and the Government has given us €150 million specifically for a regional property development programme to put some of the enabling infrastructure in place in advance of an investment decision, with a view to raising the overall attractiveness of a variety of locations including rural areas.

On data centres, there are approximately 45 in the country. We look at their development in two phases. They first appeared in the 1990s and the vast majority of them were attracted to the eastern seaboard and the region near Dublin for two reasons. They needed high-capacity, high-speed broadband and they needed access to the high-capacity points in the electricity grid. There was an automatic bias, therefore, towards the eastern seaboard, which was understandable from their perspective to enable their businesses to operate. Following EirGrid's reinforcement and investment in the national grid on a national basis, and following investment in fibre-optic cables, we anticipate a second phase of growth where the data centres will take a more active look at regional locations, potentially including the Senator's region. We have completed a report looking at a variety of locations in a regional context that could potentially accommodate the next phase of data centre development. We now see the data centre industry potentially becoming an instrument or a vehicle for regional development.

**Senator Michelle Mulherin:** What are the additional costs of doing business?

**Chairman:** With carbon taxes and the public service obligation, PSO, levy.

**Senator Michelle Mulherin:** Yes.

**Mr. David Hegarty:** We have not done a formal assessment of what the costs would be for the enterprise sector if there was an increase in the carbon tax or the PSO levy. Some research was published by the Economic and Social Research Institute, ESRI, last week which argued that for the exports sector the effects of an increase in the carbon tax of €5 per tonne would be relatively small in terms of competitiveness. That is the ESRI's finding and I just wished to

draw the committee's attention to it. There are limitations attached to the institute's methodology, however, and one cannot infer that a much bigger increase in the carbon tax would not necessarily have a stronger effect.

**Senator Ian Marshall:** Most of the questions that were floating through my head have been answered. I echo the concerns of Senators Mulherin and Daly about rural versus urban.

Mr. Donoghue referred to the fact that most of the IDA's investment is in low carbon industries where it is not a problem or is not something high on the list of priorities. If there is an industry for which it is a concern, are there enough support mechanisms for the industry to go to the next level, to take an industry from one that presented a problem historically to becoming one that will be able to contend with new regulations and commitments to targets that they would struggle to achieve on its own?

**Mr. Kieran Donoghue:** The IDA does not target sectors or industries that have large carbon footprints or are associated with high carbon emissions. That is the starting point. To the extent that an investment might appear in the IDA's portfolio where the carbon footprint of the investor is above average, the IDA has a range of programmes and schemes that it would draw to the attention of that investor to enable it to proactively lower its carbon emissions by, for example, moving to a 100% renewable energy model. The IDA would be proactive in that context.

**Senator Grace O'Sullivan:** Is there a specific policy on that?

**Mr. Kieran Donoghue:** There is an environmental aid programme to which I referred earlier. It specifically provides financial incentives to allow companies move to a 100% renewable energy model, to embrace combined heat and power or biomass and other energy efficiency technologies.

**Chairman:** Would Mr. Donoghue be able to provide the committee with a note on that?

**Mr. Kieran Donoghue:** Yes.

**Chairman:** It would be fantastic if he could submit that to the clerk.

**Mr. Kieran Donoghue:** I am more than happy to do so.

**Ms Rowena Dwyer:** I echo what Mr. Donoghue has said. I also want to make clear that, for domestic enterprises which might be facing the same challenges - the larger ones to which that the Senator has alluded - Enterprise Ireland has also, for a number of years, had in place a programme to support significant capital investment in areas like combined heat and power to allow companies improve their emissions or carbon footprints.

**Chairman:** The witnesses made reference to the success of the Action Plan for Jobs. The discussion has moved to a different space now and we are dealing with energy and its effect on greenhouse gas emissions. Returning to the success of the Action Plan for Jobs and the governance of that, the committee, in the course of its work around climate change, has become aware of the fact that this needs to be cross-departmental. A clear governance structure is needed if Ireland wants to meet its 2030 and 2050 targets. From the witnesses' experience, how did the governance of the action plan for jobs work? How were the different public bodies held to account? Was that a new structure? Unemployment reduced from 16% to 5% and the committee would appreciate any enlightenment as to that governance structure that may be able to work for us.

**Dr. Orlaigh Quinn:** A particular methodology was put in place. It was led by the Department of Business, Enterprise and Innovation and the Department of the Taoiseach. We had that whole-of-Government approach from the word go. Within the framework we set, each Department identified the actions it could take to deliver. There was a strong focus on delivery and implementation thereafter. Representatives from the Department of Business, Enterprise and Innovation met quarterly with the Taoiseach, as part of a Cabinet committee, to report on the action plan and how Departments were doing. There was a strong governance approach, which was important. There was also strong input from colleagues. Addressing Ireland's unemployment problem was recognised as a huge and important emergency issue. It had huge buy-in around the system and people recognised its importance.

**Chairman:** Were Secretaries General part of that mini-Cabinet in relation to jobs? Did Secretaries General from different Departments come on board?

**Dr. Orlaigh Quinn:** Typically for Cabinet committees it is a Secretary General, or at least an assistant secretary, who is leading. They would have also contributed within each Department. There was a pulling together that was led by our Department, typically at assistant secretary level, and the same at the Department of the Taoiseach, to prepare that work. Mr. Hegarty might like to add to that.

**Mr. David Hegarty:** We hope to maintain the approach in the future jobs initiative. We will lead on that jointly with the Department of the Taoiseach. We will keep that institutional set-up because it has been successful and we hope to again bring that dynamic to bear on the future jobs initiative.

**Dr. Orlaigh Quinn:** The approach at the start of the Action Plan for Jobs was to take every possible action we could think of into the plan. The first plan had something like 320 actions. Some of them were small, although everything had an importance. When we move to future jobs, we are talking about 20 big actions, so we are trying to home in on what is important. That is not to say those 20 actions will ignore things that are already happening but some Departments are doing that work anyway and do not need the collective, cross-Government approach. The Department has learned over the seven years of the Action Plan for Jobs that each new iteration saw a reduced number of actions and the Department prioritised based on what was high impact and what was low impact. The focus in the next phase, next year, will be on the 20 big things that can be done to drive Ireland's enterprise and economic approach for the next ten years.

**Chairman:** When it comes to reaching the targets and putting pressure on every Department to see what can be done for job creation, be that the Department for Education and Skills or social welfare, what was the stick?

**Dr. Orlaigh Quinn:** People actively engaged because it was recognised as important. The stick was probably the reporting. Department officials regularly reported to the Taoiseach, or the relevant Minister, or a Cabinet committee. I would not call it the stick, but it was important from that perspective that a track was kept. There were many actions taken collectively, not just within one Department. Many of the things our Department does are not delivered by ourselves, but through work with colleagues across Government. People recognised that and there was a lot of working together on joint projects, which was positive.

**Chairman:** Is there anything the witnesses would like to say in conclusion?

**Dr. Orlaigh Quinn:** If there is anything that we can follow up on to provide support to the committee, we are more than happy to feed into that. We have a lot of research and evidence that might help the committee in its deliberations.

**Senator Grace O’Sullivan:** Is there more time for questions?

**Chairman:** Very briefly. I would like to finish within the next five minutes if that is possible.

**Senator Grace O’Sullivan:** The Department’s remit is business, enterprise and innovation. How will we decouple economic growth from the greenhouse gas emissions? I am a little disappointed because I was hoping for some blue sky stuff today where we would be talking about renewables and the enterprise and opportunities that are happening here and now in renewables and I have heard nothing in that regard.

Has Dr. Quinn looked at the recommendations of the Citizens’ Assembly? What opportunities does she see in the recommendations of the Citizens’ Assembly relating to enterprise and innovation? I am looking at micro-generation. How can the Department support communities in terms of micro-generation? What tools has the Department available to it? We need to recognise the urgency. We are talking about 12 years. We need a massive change in how we are doing business and enterprise in Ireland. There are opportunities in terms of innovation. Could the witnesses give me some sense of that?

What is the Department doing to decrease greenhouse gas emissions in terms of oil exploration and oil and gas exploitation? In terms of the mechanisms that are emitting greenhouse gases into the atmosphere, what work is going on in the Department to stop this happening as quickly as possible?

**Chairman:** I will allow a brief question from Senator Mulherin.

**Senator Michelle Mulherin:** My question is directed to Professor Mark Ferguson. I want to acknowledge the great work being done by Science Foundation Ireland. In his opening statement, Professor Ferguson referenced marine energy resources. Will he comment on the road towards the commercial viability of wave energy and offshore wind not in the Irish Sea but in the Atlantic Ocean, where this is more challenging?

**Dr. Orlaigh Quinn:** I will respond to some of the questions and then Professor Ferguson will comment. On the Department’s response to the Citizens’ Assembly, the assembly is hugely important but I think its work in this area was more focused on the private individual than on enterprise. The Department has to address climate change in the context of enterprise across Ireland. There is no doubt that there are conflicting objectives here. For enterprises to be able to plan and change takes time, support and assistance. In regard to micro-generation, to be helpful I will send the committee details on the regional action plans and the dedicated work that is ongoing in this area.

**Chairman:** That would be helpful. Would Professor Ferguson like to comment now?

**Professor Mark Ferguson:** I am delighted to hear the question on blue sky thinking. I will be brief. The committee’s discussions, appropriately, are focused around mitigation, reducing emissions, trying to insulate and do things better and that is terrific but there is new science coming on stream around how to actively cut emissions without necessarily cutting activity. I will send the committee the report of the Royal Society and Royal Academy of Engineering

entitled, Greenhouse Gas Removal, from which I will comment on two or three issues relevant to Ireland.

I have spoken a little about the rehydration of peatlands and carbon capture. I ask that the committee not necessarily demonise oil and gas because we are getting close to low carbon gas. There is a lot of gas extraction going on offshore in Mayo and Cork. Once gas has been extracted from a particular area one then concentrates on pumping back down carbon dioxide. These fossil fuels will be required in any transition to a low carbon economy. The trick is to lower the carbon footprint of the gas extraction. There is a big business opportunity in terms of reusing the vast amount of empty space available once the gas has been taken out.

I would like now to focus on an issue I have not spoken about before, particularly for the benefit of members from rural Ireland. Five per cent of the world's global emissions are from concrete manufacture. Concrete is used in buildings. When silica is heated it gives off carbon dioxide and this leaves one with a carbonate which makes concrete. There is an alternative way of doing this. Basalt, of which there is a lot in Donegal and in the North of Ireland, can be crushed into a powder and spread over the ground. It then absorbs carbon dioxide from the atmosphere. This is one way of trapping carbon dioxide out of the atmosphere. This can be used as a fertiliser but interestingly it can also be used for making concrete. If concrete is made in the way I have just described not only is the carbon footprint reduced, the concrete is stronger and throughout the life of the building it absorbs CO<sub>2</sub>. In terms of visionary thinking, grinding up basalt would lead to a whole new industry in rural Ireland. This is a really interesting strategy, which is at research stage and also at the early implementation stage. There is a very exciting and active research pathway but it would be wrong to say that any of those is immediately commercialisable.

Senator Mulherin asked about marine renewable energy, which is definitely an active research area. Currently, it is expensive and inefficient, which is being examined in the research. Wind and so on is much more efficient at the present time but this does not mean that wave energy cannot improve. There are active research groups around the world, including Marine and Renewable Energy Ireland, MaREI, SFI's research centre in Cork. I encourage the committee to visit the centre, where members will see test wave plants and so on. Wave energy has potential for the future. All of these areas for potential for the future.

As a scientist I am optimistic. Climate change is a big problem and a big issue but I remind the committee that no crisis that was ever predicted in human history has come to pass. Many times we have predicted that we were going to run out of food but it has never happened. Why? It is because science innovation has moved faster than the crisis, through either mechanisation of farms, the fertilisation of ground, genetic engineering of crops and so on. I believe the opportunity in climate change will be for the science and innovation to move faster than the problem. This means doing what we do better in terms of mitigation and so on and focusing on new industries. I ask the committee not to lose sight of this and that we have to transition from existing fossil fuels into a new era, part of which is low carbon gas.

**Senator Grace O'Sullivan:** If we are going to look to new technologies and new ways of doing things, then what is most important is that we do it for the common good.

**Professor Mark Ferguson:** Correct.

**Senator Grace O'Sullivan:** It is important that in moving to clean energy and renewable energies we do things right but as a nation we are not doing it right.

**Dr. Orlaigh Quinn:** As a senior civil servant, we work for the common good . That is the role of Department and that is what we aim to achieve every day in our work.

**Chairman:** I thank all of the witnesses for being here this afternoon.

**Senator Ian Marshall:** The witnesses kept the best news until last.

**Chairman:** The future, hopefully, is bright.

The joint committee adjourned at 15.50 p.m. until 2 p.m. on Wednesday, 24 October 2018.